

Financial_Time_Series_Data_Analysis_Using_R.R

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```
# Project 1 - Financial Time-Series Data Analysis using R

# Obs: Accentuations problems, please, consult the link below:
# https://support.rstudio.com/hc/en-us/articles/200532197-Character-Encoding

# Set workspace.
# Do not use space or accentuations.
setwd("C:/CursoFCD/3.0BigData_Analytics_R_e_Azure_MachineLearning/Pratica/Cap07")
getwd()

## [1] "C:/CursoFCD/3.0BigData_Analytics_R_e_Azure_MachineLearning/Pratica/Cap07"

options(warn=-1)

#### Install and Load Packages ####
# install.packages("quantmod")
# install.packages("xts")
# install.packages("moments")
library(quantmod)

## Loading required package: xts
## Loading required package: zoo
##
## Attaching package: 'zoo'
## The following objects are masked from 'package:base':
##
##   as.Date, as.Date.numeric
## Loading required package: TTR
## Registered S3 method overwritten by 'quantmod':
##   method      from
##   as.zoo.data.frame zoo
## Version 0.4-0 included new data defaults. See ?getSymbols.

library(xts)
library(moments)

#### Define the Analysis Period ####
# From 01/21/2020 to 08/21/2020
startDate = as.Date("2020-01-21")
endDate = as.Date("2020-08-21")
```

```
#### Extract financial data from YAHOO ####
# Use the function "getSymbols" to consult "ABEV3.SA" data:
getSymbols("ABEV3.SA", src = "yahoo",
           from = startDate,
           to = endDate,
           auto.assign = T)

## 'getSymbols' currently uses auto.assign=TRUE by default, but will
## use auto.assign=FALSE in 0.5-0. You will still be able to use
## 'loadSymbols' to automatically load data. getOption("getSymbols.env")
## and getOption("getSymbols.auto.assign") will still be checked for
## alternate defaults.
##
## This message is shown once per session and may be disabled by setting
## options("getSymbols.warning4.0"=FALSE). See ?getSymbols for details.

## [1] "ABEV3.SA"
# Check the object class:
class(ABEV3.SA)

## [1] "xts" "zoo"
is.xts(ABEV3.SA)

## [1] TRUE
head(ABEV3.SA,3)

##           ABEV3.SA.Open ABEV3.SA.High ABEV3.SA.Low ABEV3.SA.Close
## 2020-01-21           18.68           18.92           18.66           18.74
## 2020-01-22           18.85           19.08           18.77           19.05
## 2020-01-23           18.90           19.03           18.59           18.65
##           ABEV3.SA.Volume ABEV3.SA.Adjusted
## 2020-01-21          11249000              18.74
## 2020-01-22          13925400              19.05
## 2020-01-23          20155900              18.65

#### Financial Closing Data ####
# Financial Closing Data Analysis
# na.omit to remove NA values from original time-series data
ABEV3.SA.Close <- na.omit(ABEV3.SA[, "ABEV3.SA.Close"], na.action = "exclude")
is.xts(ABEV3.SA.Close)

## [1] TRUE
ABEV3.SA.Close <- ABEV3.SA.Close[-25]
head(ABEV3.SA.Close,3)

##           ABEV3.SA.Close
## 2020-01-21           18.74
## 2020-01-22           19.05
## 2020-01-23           18.65

#### Plot AMBEV ####
# AMBEV3.SA Candlestick Plot:
candleChart(ABEV3.SA)
```

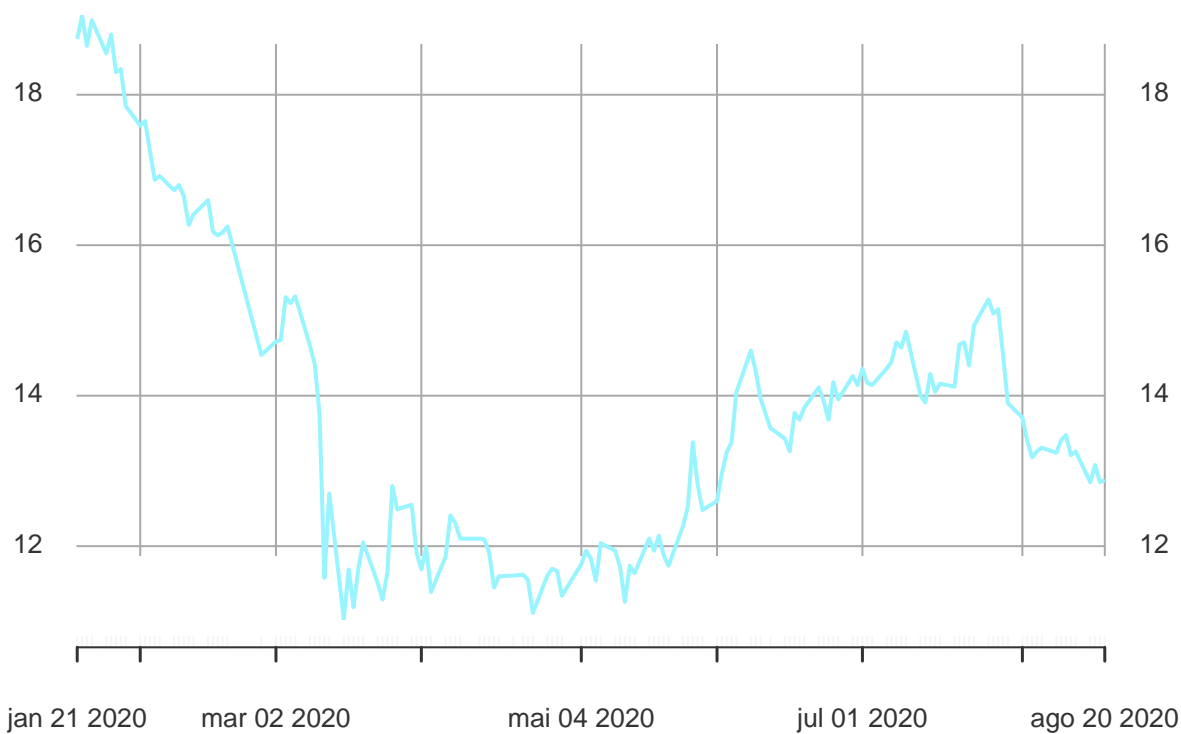


Financial Closing Data Plot:

```
plot(ABEV3.SA.Close,
     main = "AMBEV3.SA Daily Closing Shares",
     col = "cadetblue1", xlab = "Data",
     ylab = "Price",
     major.ticks = "months",
     minor.ticks = FALSE)
```

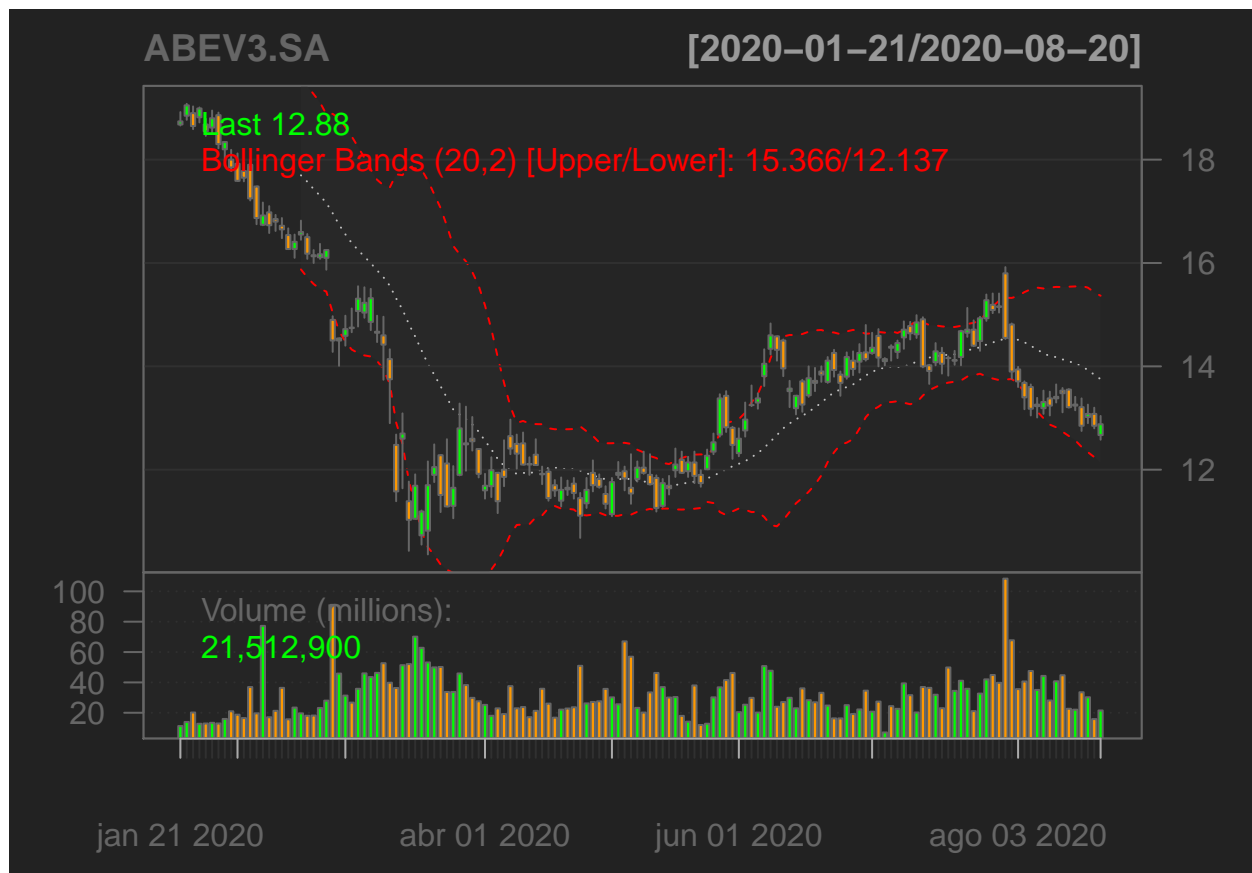
AMBEV3.SA Daily Closing Shares

2020-01-21 / 2020-08-20



Bollinger Bands

```
addBBands(n = 20, sd = 2)
```



```
#### Index ADX CandleChart ####  
addADX(n=11, maType = "EMA")
```



Daily logs

```
ABEV3.SA.ret <- diff(log(ABEV3.SA.Close),lag = 1)
ABEV3.SA.ret <- na.omit(ABEV3.SA.ret, na.action = "exclude")
head(ABEV3.SA.ret,3)
```

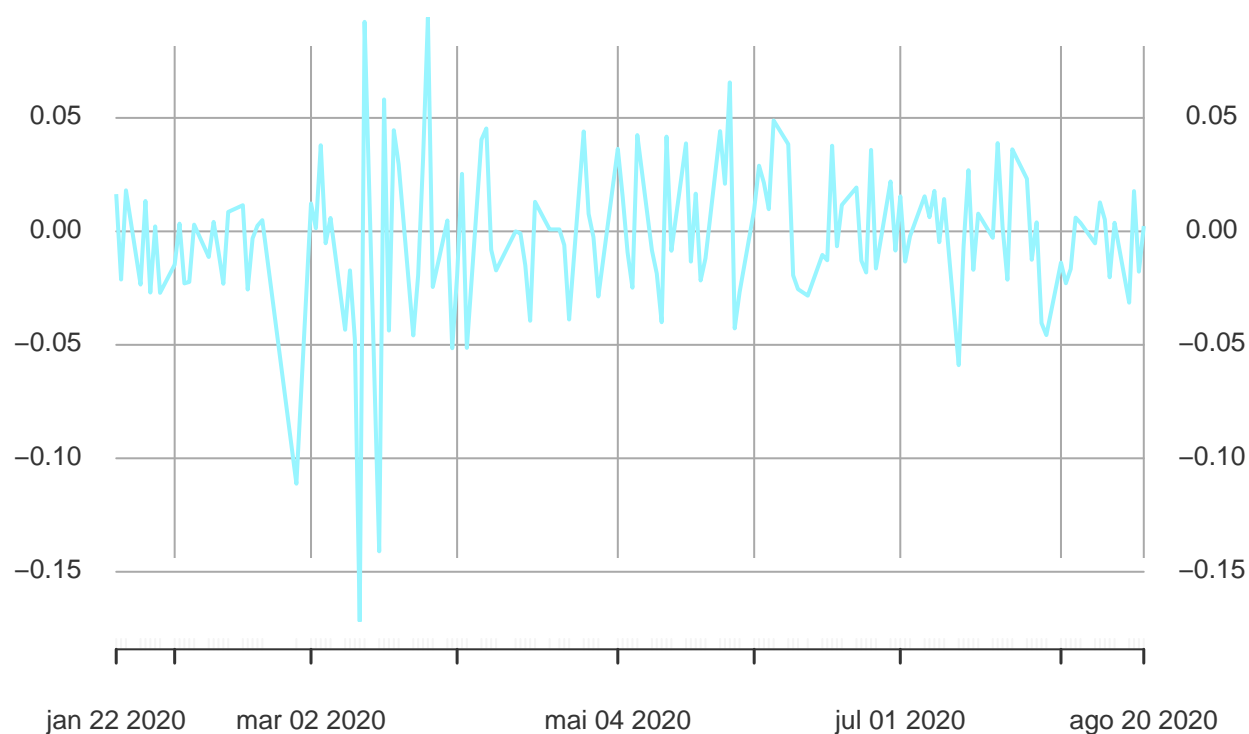
```
##           ABEV3.SA.Close
## 2020-01-22    0.01640677
## 2020-01-23   -0.02122090
## 2020-01-24    0.01806638
```

Return Rate Plot

```
plot(ABEV3.SA.ret,
     main="ABEV3.SA Daily Closing Shares",
     col="cadetblue1",xlab="Data",ylab="Return",
     major.ticks="month",
     minor.ticks=FALSE)
```

ABEV3.SA Daily Closing Shares

2020-01-22 / 2020-08-20



Statistics

```
statNames <- c("Mean", "Standard Deviation",
               "Skewness", "Kurtosis")

ABEV3.SA.stats <- c(mean(ABEV3.SA.ret), sd(ABEV3.SA.ret),
                   skewness(ABEV3.SA.ret), kurtosis(ABEV3.SA.ret))
names(ABEV3.SA.stats) <- statNames
ABEV3.SA.stats
```

##	Mean	Standard Deviation	Skewness	Kurtosis
##	-0.002604059	0.034263013	-1.074486561	8.428591283

Save Data in rds type

```
saveRDS(ABEV3.SA,
        file = "ABEV3.SA.rds")
Abv = readRDS("ABEV3.SA.rds")
head(Abv, 2)
```

##	ABEV3.SA.Open	ABEV3.SA.High	ABEV3.SA.Low	ABEV3.SA.Close
## 2020-01-21	18.68	18.92	18.66	18.74
## 2020-01-22	18.85	19.08	18.77	19.05

##	ABEV3.SA.Volume	ABEV3.SA.Adjusted
## 2020-01-21	11249000	18.74
## 2020-01-22	13925400	19.05